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AUTHOR Paulhus, Delroy L.; Lim, David T. K.
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ABSTRACT

Previous work has demonstrated the importance of Osgood's three semantic dimensions (Evaluation, Potency, Activity) in people's conceptions of various domains. To test the effects of arousal on how individuals use these dimensions, three studies were conducted. In each study, six stimuli from a particular domain were presented in pairs. Subjects rated how similar one stimulus was to the other, while being exposed to loud or soft white noise. In study one on the social domain, 28 male undergraduate students judged the similarities of six of their acquaintances; in study two subjects rated similarities of university courses; and in study three they rated self-roles. The results showed that a high level of arousal induced by the loud noise acted to reduce subjects' cognitive complexity. For the social domains (acquaintances and self-roles), high arousal led to increased use of the "Like-Dislike" (Osgood's Evaluation) dimension. For the non-social domain (university courses), arousal enhanced the use of the arts versus science dimension. In all three studies, arousal inflated the importance of the primary dimension of judgment. Arousal enhanced the importance of evaluation only in domains where evaluation was the primary dimension to begin with, i.e., the two social domains. The reduction of complexity under stress is viewed as an adaptive mechanism suggesting that given an affective threat, a normally open-minded person may exhibit simplistic thinking based primarily on evaluative consideration. (Author/NRB)

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The Effects of Arousal on Cognitive Complexity

Delroy L. Paulhus and David T.K. Lim

University of British Columbia

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Abstract

Previous work has demonstrated the importance of Osgood's three semantic dimensions (Evaluation, Potency, Activity) in people's conceptions of various domains. To test the effects of arousal on how individuals use these dimensions, three studies were conducted. In each study, six stimuli from a particular domain (acquaintances, university courses, self-roles) were presented in pairs. Subjects rated how similar one stimulus was to the other, while being exposed to loud or soft white noise. Results showed that a high level of arousal induced by the loud noise acted to reduce subjects' cognitive complexity. For the social domains (acquaintances and self-roles), high arousal led to the increased use of the "Like-Dislike" (Osgood's Evaluation) dimension. For the non-social domain (university courses), arousal enhanced the use of the arts vs science dimension. The implications of these findings were discussed for decision-making processes in stress-related situations, e.g., defense mechanisms.

Recently, Paulhus (1984) has proposed a model of psychological defenses based on the idea that an individual's cognitive complexity is regulated by level of arousal. When stress increases arousal above optimal levels, the effects are: (1) a reduction in the complexity of social perception and (2) an exaggerated weighting of evaluation in making social judgments. Part of this model was shown in a study by Paulhus and Levitt (in press) where indirect arousal effects induced a greater weight on the evaluative aspects of the stimuli.

The present study was designed to be a direct test of the effects of arousal on cognitive complexity. We wanted a manipulation of arousal that was powerful but neutral in affective tone. We decided to use white noise, based on substantial evidence that noise levels of 80 db and above are arousing. We also needed a state measure of cognitive complexity, that is, a measure that is sensitive to short-term fluctuations in complexity. To accomplish this, we used the subject's ratings of similarity among a set of stimuli in the domain of interest. Subsequent multidimensional scaling would reveal the dimensions that subjects used to configure that domain.

We conducted three studies, each dealing with a different stimulus domain. In many domains the three primary dimensions of judgment are Osgood's "Big Three": Evaluation, Potency, and Activity. The Evaluation dimension appears to be the most primary, particularly in social judgments. Thus, in Study 1, we looked at a social domain by asking subjects to judge the similarities of six of their acquaintances.

Study 1-- Judging Acquaintances

Method

Subjects. Subjects were 28 male undergraduates participating for extra course credit.

Procedure. Subjects were run individually in the laboratory. First, they were asked to name six acquaintances. We set up the choice of acquaintances to encourage the use of Osgood's three dimensions (Evaluation, Potency, and Activity). To do this, we asked them to first name an acquaintance they liked, then one they disliked, one they thought was forceful, not forceful, industrious, and not industrious. This was an attempt to anchor Osgood's 3 dimensions. The names of the acquaintances were typed into the microcomputer which subsequently presented the subject with all 15 possible pairs of the 6 acquaintances, one pair at a time. After 10 seconds, the computer program instructed subjects to respond. This ensured equivalent response times across subjects and conditions.

All subjects wore earphones while rating the dissimilarities among the stimuli. Half the subjects listened to soft white noise (30 db) and half listened to loud white noise (90 db).

Results

We used the ALSCAL program to perform multidimensional scaling on the 6 x 6 dissimilarity matrices. First, we simultaneously scaled the matrices of all 28 subjects. The resulting group space is shown in Figures 1 and 2. The figures show that we were successful in separating the three dimensions. The first dimension is anchored by the Liked and Disliked acquaintances. Similarly, a second dimension is anchored by the forceful and the not forceful acquaintances. Finally, a third dimension is anchored by the industrious and not-industrious acquaintances.

To examine the differences between the loud and soft-noise conditions, we looked at the average dissimilarity matrices for each condition (see Table 1). To index the relative importance of the evaluation dimension, we calculated, for each subject, the Importance ratio (or I-ratio)-- i.e., the ratio of the dissimilarity rating of the Liked vs. Disliked pair divided by the sum of the dissimilarity ratings of the Forceful vs. Not Forceful pair and the Industrious vs. Not Industrious pair. This ratio was higher for subjects in the loud condition, $p < .06$. Thus, subjects in the loud condition placed more emphasis on Evaluation than subjects in the soft condition. In addition, Kruskal's "badness of fit" measure was lower in the loud than in the soft condition, but the difference did not reach significance.

Study 2-- Judging university courses

In most respects the procedure was identical to that of Study 1. However, we didn't think that Osgood's three dimensions were appropriate for judging university courses. Consequently, we kept the evaluation dimension, and added course difficulty and class size. To encourage the use of these three dimensions, we had subjects name courses that were likeable, not-likeable, difficult, not-difficult, and large and not-large.

The three intended dimensions did not emerge clearly in the group space. When comparing the loud and soft conditions, we found that all the three critical dissimilarities were getting smaller under loud noise-- i.e., all three given dimensions became less important under arousal.

To determine what dimension(s) subjects actually did use, we looked back at the actual courses each subject had named. It appeared that subjects were giving large dissimilarities when comparing arts courses with science courses. To index the importance of the arts vs science dimension, we calculated the I-ratio for each subject--i.e., the arts vs science dissimilarity rating divided by the sum of the arts vs arts and science vs science dissimilarity ratings. This ratio was significantly larger for subjects in the loud condition than in the soft condition, $p < .05$. Therefore, subjects emphasized the Art/Science dimension significantly more under high-arousal than low-arousal conditions. It seems that we should have included art vs science as one of our original dimensions,for it appears to be the primary dimension that students use in comparing university courses.

Study 3 -- Judging Social Self-Roles

The procedure was the same as in Studies 1 and 2. This time, however, we gave subjects the six stimuli (namely six social self-roles, based on Linnville's self-roles), instead of asking them to name their own self-roles that fit into Osgood's dimensions. By using a standard set of social roles, we could then make comparisons with Linnville's work.

In looking at the average dissimilarity ratings of the six self-roles across both noise conditions, we found that the roles of Student and Friend to Women were the most dissimilar. The second most dissimilar role-pair was Son and Friend to Women,and the third most dissimilar role-pair was Leader and Friend to Women. Again, adopting the I-ratio, we compared the relative importance of the primary dimension (i.e., the most dissimilar role-pair) by taking the dissimilarity rating of Student vs. Friend to Women divided by the sum of the dissimilarity ratings of Son vs. Friend to Women and Leader vs. Friend to Women. This I-ratio was higher for subjects in the loud condition, $p < .06$.

To interpret the primary dimension (as anchored by the most dissimilar role-pair) that subjects used in configuring their self-roles, we looked at the subjects' ratings of these six self-roles on Osgood's Evaluation dimension. We found that the role of Friend to Women was the most liked, and the role of Student was the least liked, $p < .005$. In short, under arousal, subjects resorted to using the primary dimension in rating their social roles, and this dimension was Evaluation.

Conclusion

What can we conclude from these three studies? In Study 1, arousal inflated the importance of evaluation in making social judgments. However, this did not occur in Study 2. Instead, in the rating of university courses, arousal inflated the importance of the arts/science distinction. Finally, in Study 3, we again found that arousal amplified the importance of evaluation in subjects' ratings of their own social roles.

In all three studies, arousal inflated the importance of the primary dimension of judgment. Furthermore, studies 1 and 3 supported the hypothesis that, under arousal, evaluation becomes the primary dimension that subjects used to make social judgments. Thus, our conclusions were a little more complicated than the original predictions. Arousal enhanced the importance of evaluation only in domains where evaluation was the primary dimension to begin with, namely the two social domains.

The reduction of complexity under stress is clearly an adaptive mechanism. Under threatening conditions, an organism's decisions must be faster and more directly linked to evaluative, i.e., affective, information. Sophisticated and subtle judgments are more appropriate for cool, safe conditions. Psychological defense mechanisms may also be based on fast alterations in cognitive complexity. Given an affective threat, a normally open-minded person may exhibit simplistic thinking based primarily on evaluative considerations.

References

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Table 1

DISSIMILARITY RATINGS OF ACQUAINTANCES

LOUD CONDITION (N=14)

	Liked	Disliked	Forceful	Not Force.	Indust.	Not Ind.
Liked	--					
Disliked	8.07	--				
Forceful	4.50	6.50	--			
Not Force.	4.29	6.36	6.07	--		
Indust.	4.57	6.71	5.43	4.50	--	
Not Indust.	4.78	5.57	5.93	5.21	5.86	--

SOFT CONDITION (N=14)

	Liked	Disliked	Forceful	Not Force.	Indust.	Not Ind.
Liked	--					
Disliked	7.29	--				
Forceful	5.14	5.43	--			
Not Force.	3.57	7.50	6.29	--		
Indust.	3.14	7.21	5.71	4.07	--	
Not Indust.	4.79	5.86	4.86	5.93	7.00	--

$$\text{Importance Ratio (I-ratio)} = \frac{D(\text{Liked vs Disliked})}{D(\text{Force. vs Not Force.}) + D(\text{Indust. vs Not Indust.})}$$

Figure 1

GROUP-SPACE CONFIGURATION OF ACQUAINTANCES.

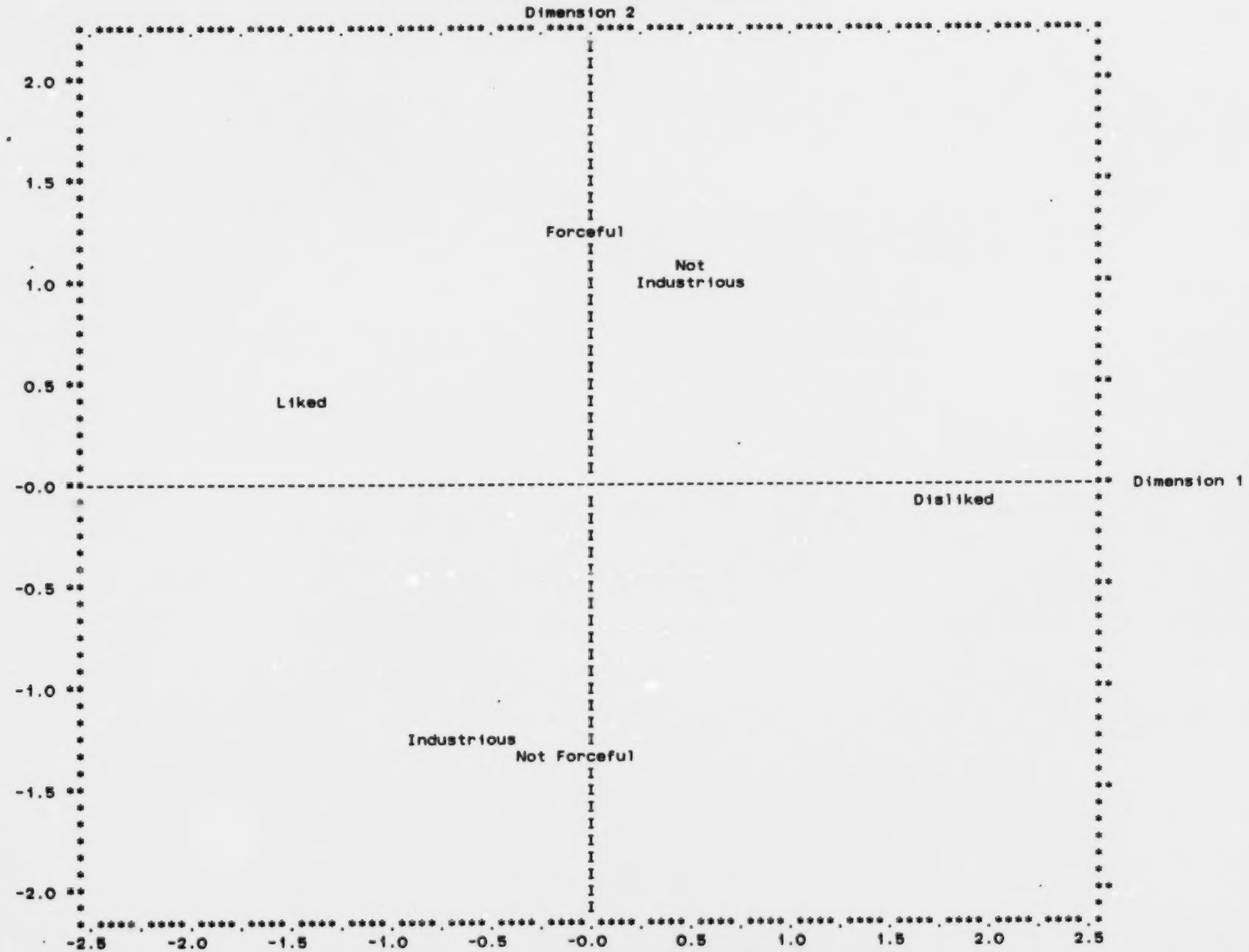

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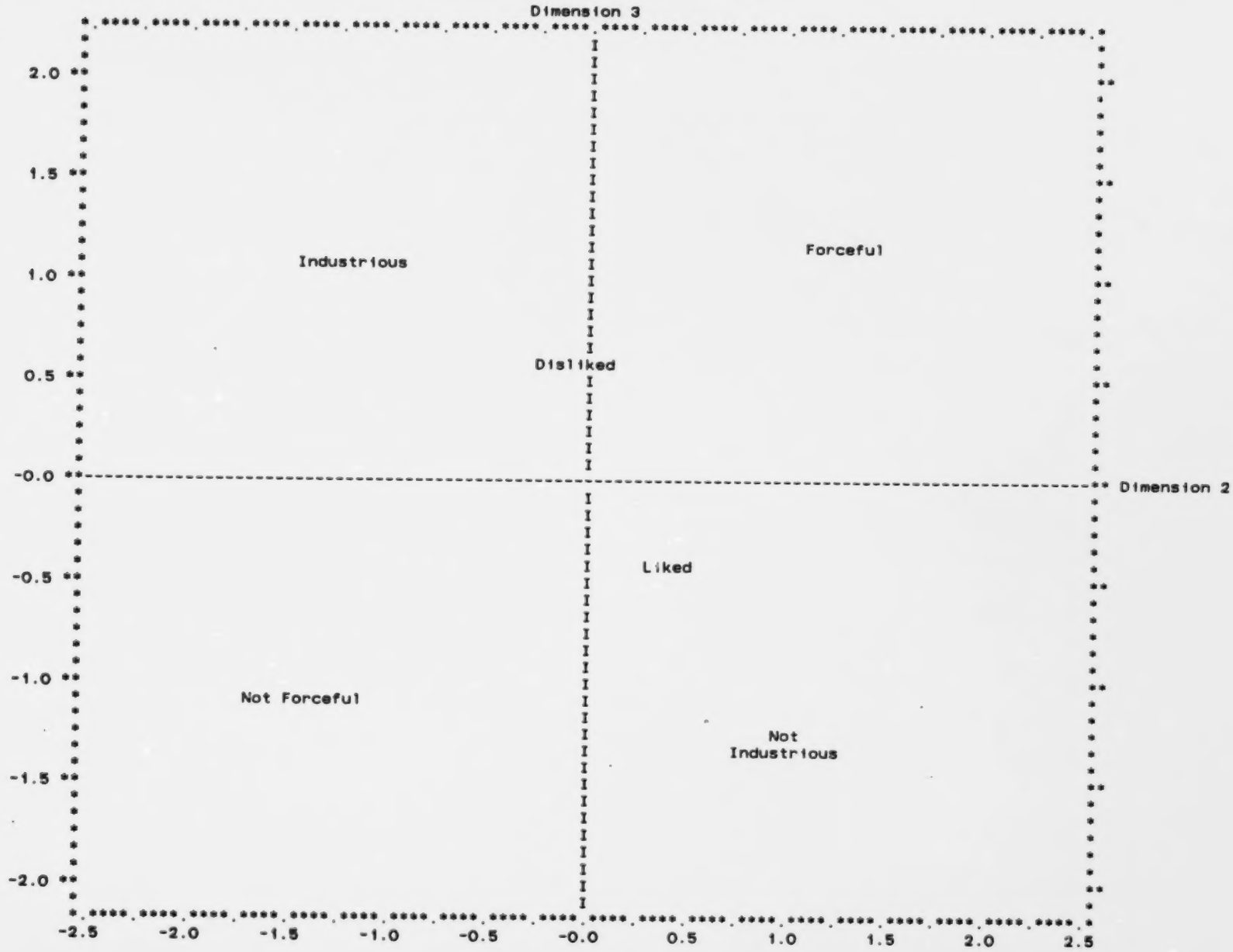
Figure 2

GROUP-SPACE CONFIGURATION OF ACQUAINTANCES.



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